WESTERN WATER ASSESSMENT

A NOAA RISA TEAM

February 2024 Newsletter

In this newsletter...

Welcome, Skye

WWA would like to welcome our new postdoctoral social science researcher, **Skye Niles**! Skye is focusing on how to reduce risk and improve resilience to climate hazards in mobile home park communities, with an emphasis on how researchers can work with frontline communities to better understand and address adaptation concerns. Skye specializes in environmental justice research and qualitative research methods. Prior to joining WWA, Skye participated in a variety of interdisciplinary research projects centered on how environmental hazards and inequalities are produced and challenged, including research on the intersections between environmental inequalities and prisons, and how community engagement improved health care response following Hurricane Maria in Puerto Rico. Skye completed her undergraduate degree in Social Welfare at the University of California Berkeley and her Masters and PhD in Sociology at the University of Colorado Boulder.

Research and Products

Drought Index Project

WWA is developing a drought information prototype tool that helps users understand drought conditions in the context of climate change. The team for this NOAA NCEI-funded project is led by **Liz Payton**, and includes postdoc **Nels Bjarke** (CU CEAE), PhD student **Prasad Thota** (CU CEAE), NC CASC climate science lead **Imtiaz Rangwala**, WWA managing director **Benét Duncan**, and WWA director **Ben Livneh**. Currently, users in the western US who apply drought indices that characterize drought based on long-term observations are finding that those indices are showing consistent and durable, rather than episodic, drought. They question whether the drought indices are simply reflecting the drying effects of climate change, or "non-stationarity." The goal of the three-phase project is to develop a prototype web tool to support users in assessing drought conditions given recent hydroclimate trends. It involves understanding how drought indices are used in decision-making, analyzing the sensitivities of the most common drought indices to non-stationarity, and developing a web-based prototype index.

Wind River Youth Camps

The University of Wyoming Haub School of Environment and Natural Resources, Greater Yellowstone Coalition, and Wind River Tribal Buffalo Initiative partnered to develop "Indigenous Youth Culture and Climate Camps" that support Indigenous ways of knowing, climate adaptive strategies, and prepare the youth for the future on the Wind River Reservation. This project was funded by WWA's Adapting to Climate Change in Wyoming grants competition. These intergenerational land-based camps focus on preserving cultural traditions while fostering a passion for environmental sustainability. WWA Research Scientist, **Seth Arens**, went to the three-day camp which was hosted on the Shoshone bison pasture on the Wind River Reservation on September 26-28, 2023, and included fifth grade, eighth grade, and high school students from the Wyoming Indian School system. This event was a success and will continue through at least next year. The organizers are working to find funding to expand the number of schools involved in the camps and to continue the camps past 2024.

Students from Wyoming Indian High School at the immersive learning event on the Shoshone bison pasture on the Wind River Reservation. Photo credit: Hannah Habermann, Wyoming Public Media.

Research Article Highlight

WWA Social Sciences Lead, **Katie Clifford**, published a paper identifying important gaps in national air quality monitoring networks' ability to detect dust and highlighting the impacts of this issue on various aspects such as the environment, climate, air quality, and human health. Despite the common occurrence of dust events across the U.S. and the significant disaster they played in our nation's history (e.g., the Dust Bowl), dust events are underestimated and therefore do not receive the level of attention necessary to fully understand their impacts. This analysis highlights three systematic issues that lead to poor monitoring of dust: 1) monitoring stations are sparse, especially in dust-influenced regions, 2) inconsistency in sampling methods, and 3) there is a lack of continuous monitoring. These three factors result in missed dust events or underestimations of their particle concentration. This paper highlights the need for additional monitoring designed to measure dust so that we can more fully understand its impacts, which are particularly important as dust is expected to increase with climate change.

https://wwa.colorado.edu/research/publications/dust-under-radar-rethinking-how-evaluate-impacts-dust-events-air-quality

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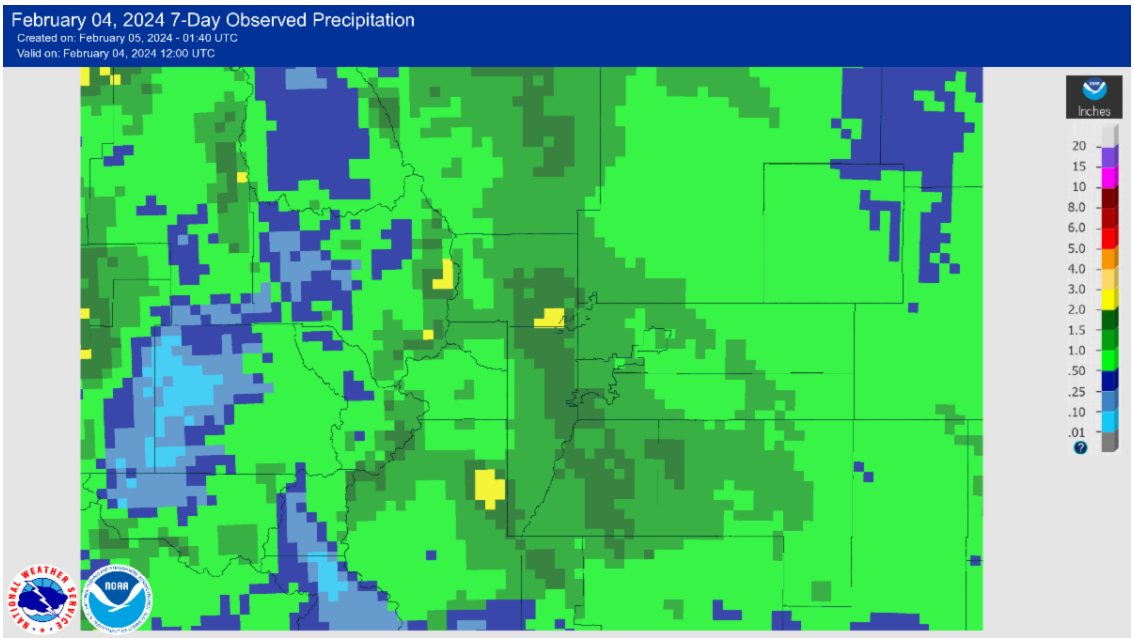
Climate Event

Record-wet Snowstorm in the Front Range

From February 2-3, the Front Range experienced an intense 18-hour precipitation deluge, with some areas receiving over 2 inches of liquid equivalent (rain and melted snow water), surpassing the total precipitation of the previous two months. A southern-track low-pressure system originating in southeastern Colorado was responsible for this substantial moisture. The storm brought heavy upslope precipitation—rain and heavy snow—to northern Colorado. Boulder received a record-breaking 1.74 inches of precipitation, making it the all-time wettest February storm since record-keeping began in 1897 and surpassing the previous record of 1.41 inches from February 3-4, 2012. Boulder received 9.1 inches of snow, Denver received 5.5 inches, and the lower foothills received up to 20.3 inches. The storm's unique characteristics, including the lack of a cold air mass and the presence of a large-scale low-pressure system that pulled in moisture and warmth from a Pacific Ocean atmospheric river and from the Gulf of Mexico, made the storm one of rain instead of snow to start. The warmer air caused snowflakes falling from a sub-freezing cloud layer to melt and turn to rain before they hit the ground, which eventually cooled the air to the point of freezing, finally allowing for snowfall and accumulation. These factors and many more created significant forecasting uncertainty as to how much snow, or precipitation in general, would fall across northern Colorado. Weather models were highly volatile days in advance to hours before the storm due to the many different atmospheric variables in this storm's setup. This weather event highlights the evolving nature of warmer winter storms in a warming climate.



WWA Features

Five faculty members selected for Community Perspectives Program

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Citizen scientists document a recovering Colorado River

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My favorite sites for tracking snow and the (subpar) snowpack

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Climate justice in academia and teaching, explored by experts

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UNIVERSITY OF WYOMING

UW professor is Regional Lead Author on National Climate Assessment report

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